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(71) Applicant

Bergische Achsenfabrik Fr Kotz & Sohne (FR Germany),  
Am Ohlerhammer, 5176 Wiehl 1, Federal Republic of  
Germany

(72) Inventor

Gerd Ide

(74) Agent and/or Address for Service

Mathisen Macara & Co.,  
Lyon House, Lyon Road, Harrow, Middlesex HA1 2ET

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F2E

## (54) Actuating device for a disc brake

(57) An actuating device for a disc brake, the brake shoes of which are disposed on either side of a brake disc and co-operate with a pull (6) and push (7) rods arrangement, pairs of cotters being disposed between the pull rod (6) and the push rod (&) as outer cotters (10) and inner cotters (11). An automatic adjustment device consists of a threaded bolt (17) with cotter elements (18) situated between the inner cotters (11), and an adjustment lever (19) arranged with a sleeve overrunning clutch on the threaded bolt (17) which co-operates with a stationary slide (21). When excessive movement of the actuator occurs due to wear, the lever (19) turns the bolt (17), and the cotter elements (18) separate the inner cotters (11), to compensate.

Fig.3

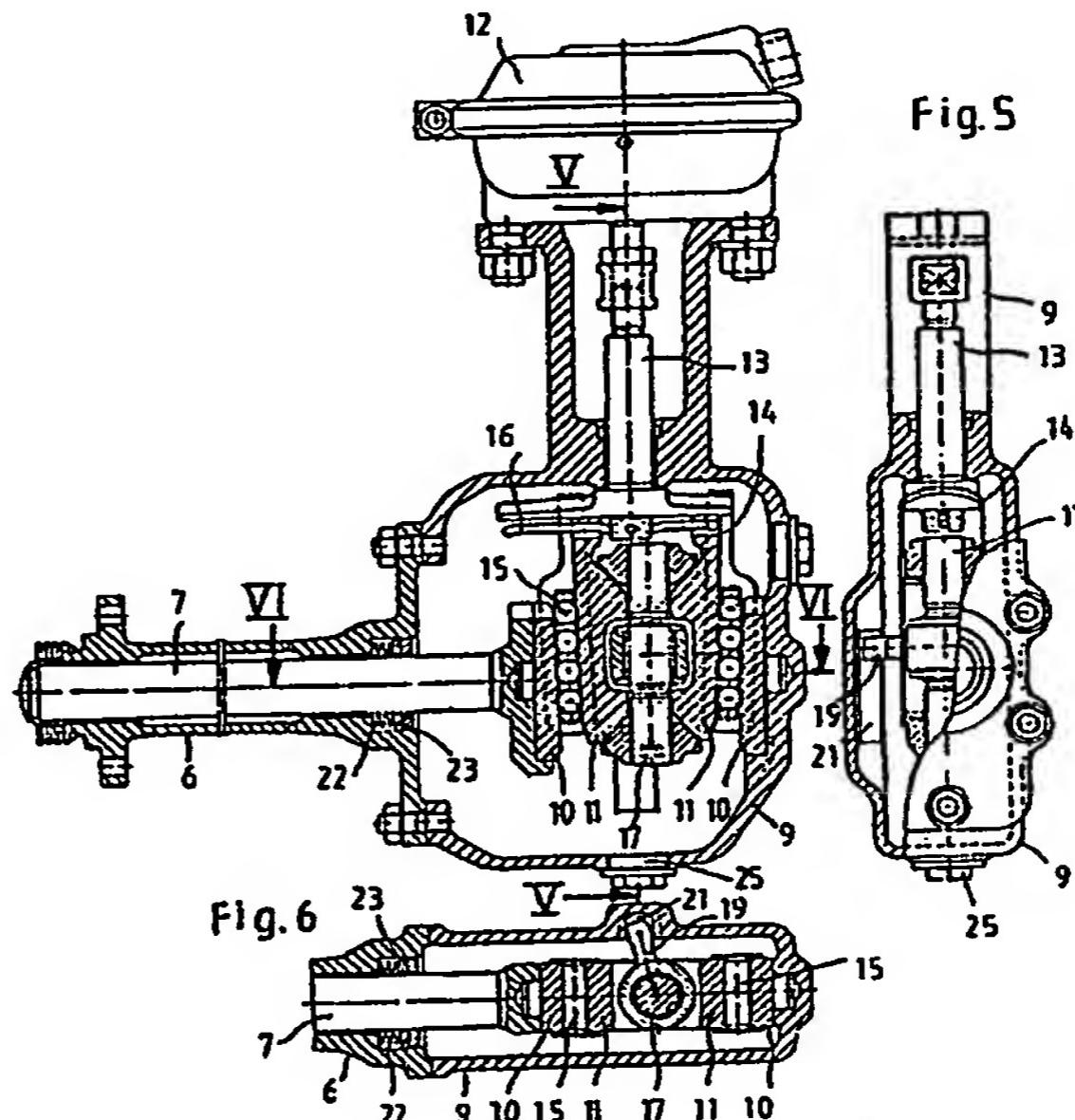
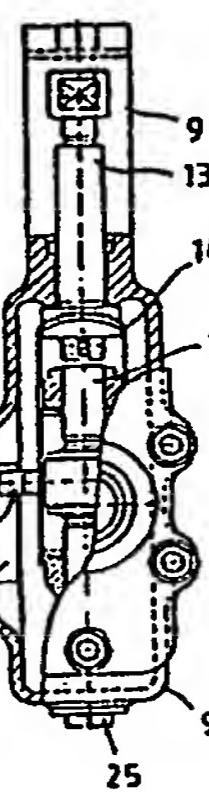


Fig.5



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Fig. 1

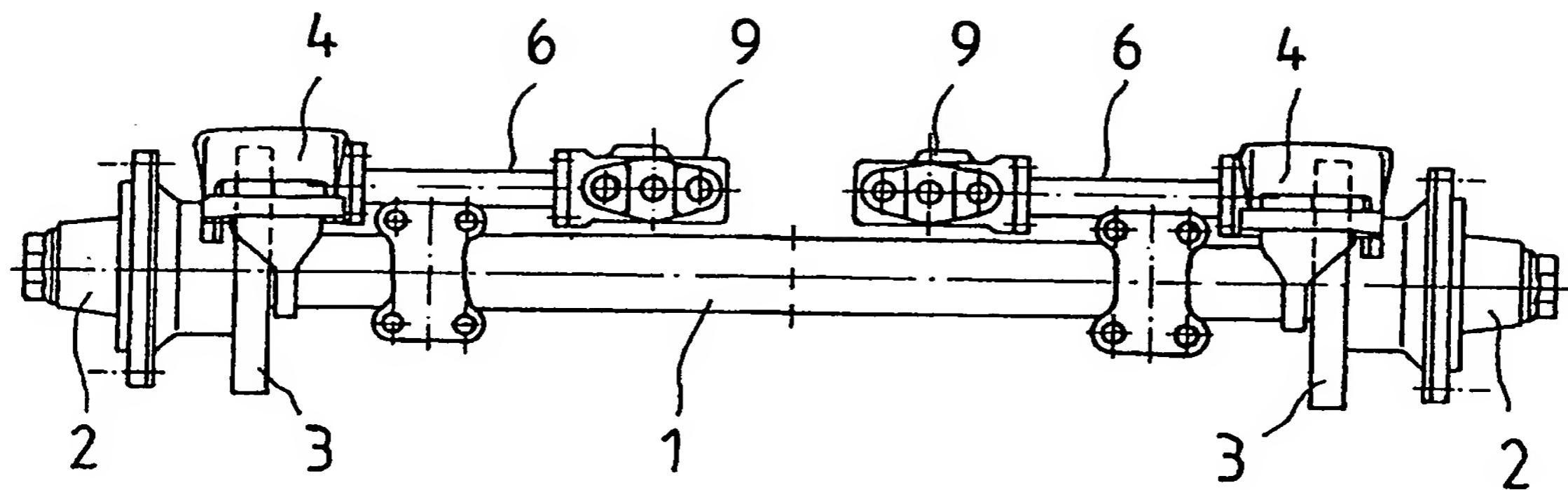
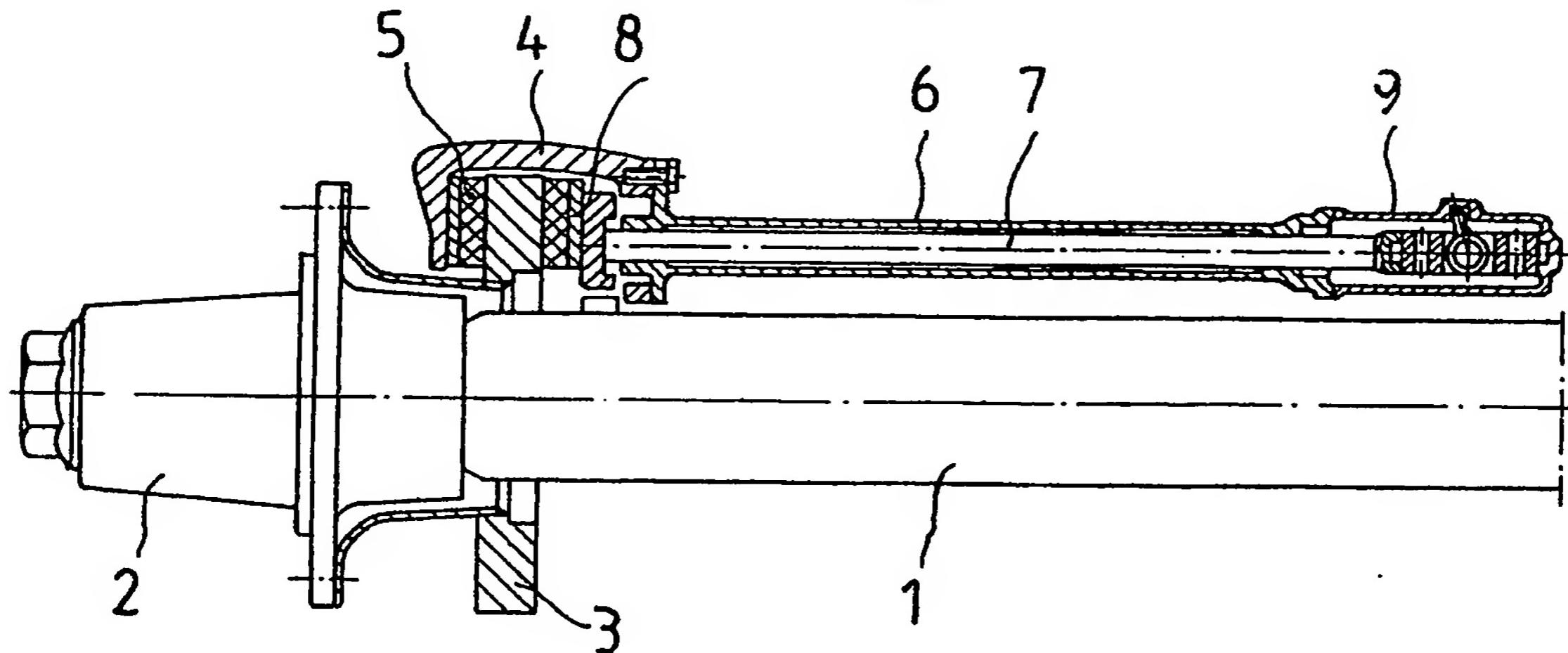


Fig. 2



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Fig.3

Fig.4

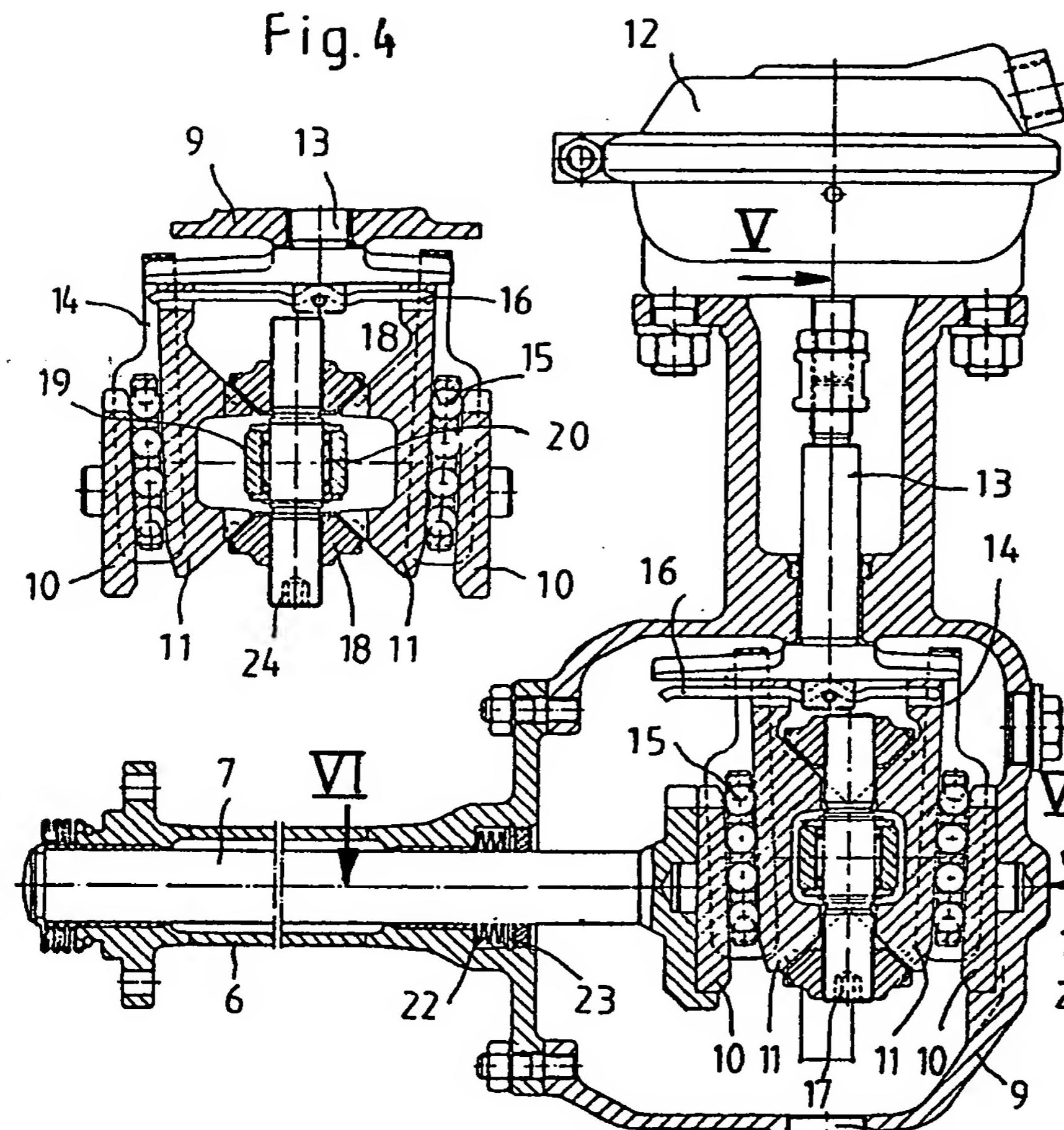


Fig.5

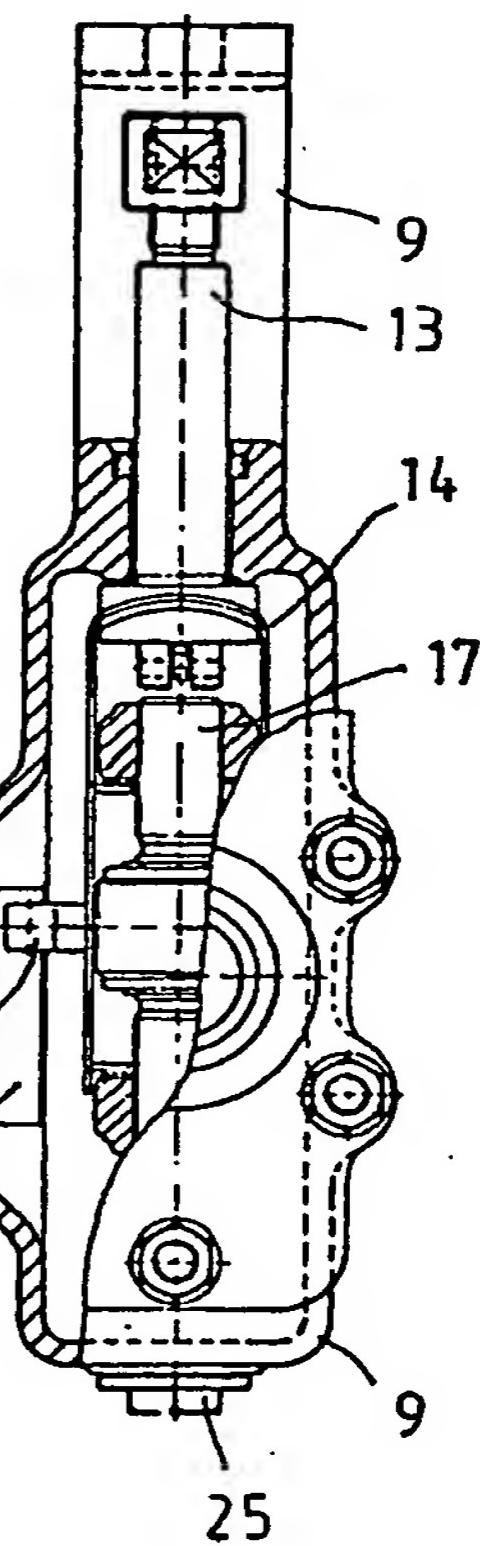
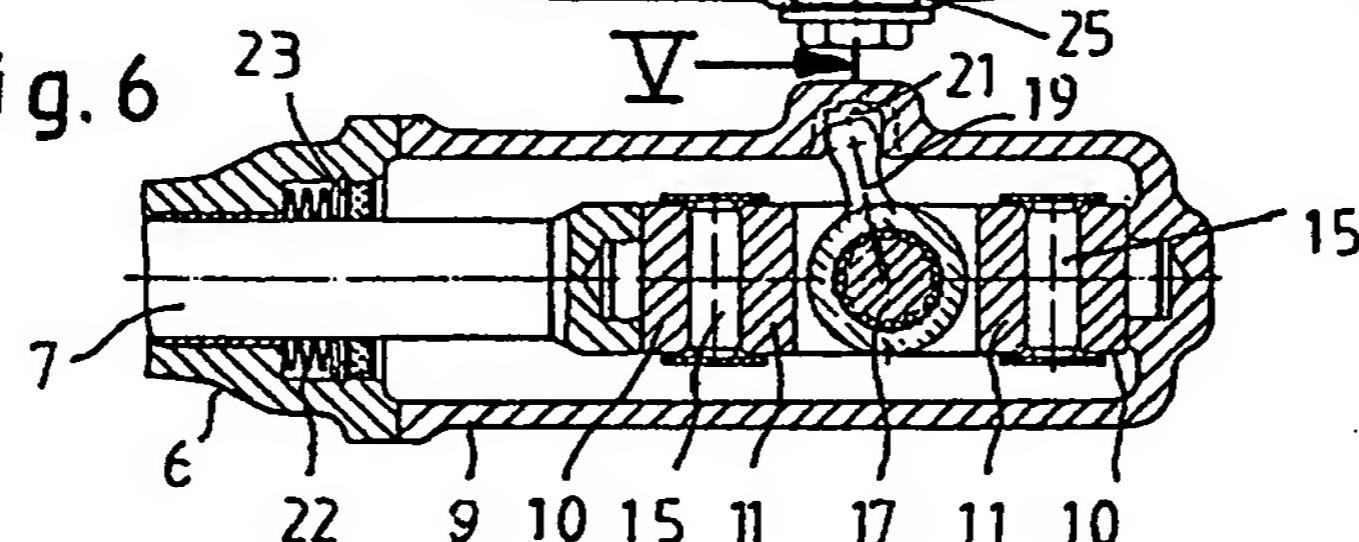


Fig.6



## SPECIFICATION

## Actuating device for a disc brake

- 5 The invention relates to an actuating device for a disc brake for motor vehicles or trailers the brake shoes of which are disposed on both sides of a brake disc.
- From DE-OS 24 00 247 a motor vehicle brake is known in which the actuation device has a one-part double cotter as a spreader. In addition, provision is made for an automatic adjustment device which has a pawl carried by the actuation cotter which co-operates with a latching wheel mounted on a spindle 15 and is to effect an automatic adjustment when an excessive stroke has taken place. This known adjustment device is of a construction that is prone to breakdowns.

From US Patent 4 194 596 an actuation device for a disc brake is known, the brake shoes of which are disposed on opposite sides of a brake disc and co-operate with a pull rod and a push rod respectively, pairs of cotters being disposed between the pull rod and the push rod as outer cotters and inner 25 cotters. Between the two inner cotters supported with rollers there is no provision for an adjustment device for compensating for brake band lining wear.

The present invention consists in an actuating device for a disc brake whose brake shoes are disposed on opposite sides of a brake disc, the device comprising a pull rod and a co-extensive push rod for co-operation with respective brake shoes, two pairs of cotters disposed between the pull rod and the push rod as outer cotters and inner 35 cotters, and an automatic adjustment device for controlling the separation distance between the inner cotters, comprising: a threaded bolt having cotter elements threaded thereon each engaging the inner faces of the inner cotters; and turning means 40 co-operating with the bolt, arranged to turn the bolt, and thus cause the cotter elements to increase the said separation distance, in response to an extreme relative movement of the inner and outer cotters.

This actuation device has the advantage of a very 45 simply constructed, reliable and maintenance-free automatic adjustment device for the compensation for brake band lining wear. Thereby the invention makes an important contribution to safety on the roads.

In order that the invention may be better understood, a preferred form of actuation device for a floating saddle type of disc brake will now be described, by way of example only, with reference to the accompanying drawings, in which:

50 *Figure 1* is an axle with floating saddle disc brakes in top view;

*Figure 2* is an enlarged section from *Figure 1* with a floating saddle disc brake shown in sectional view;

55 *Figure 3* is an actuation device for the floating saddle disc brake of Figures 1 and 2 in longitudinal section, in its starting position;

*Figure 4* shows part of the device of *Figure 3* in longitudinal section, having reached its final position;

60 *Figure 5* shows the actuation device in sectional

side view taken along the line V-V in *Figure 3*; and *Figure 6* is the same actuation device along line VI-VI in *Figure 3* in cross-section viewed from above.

Wheel hubs 2 with brake discs 3 are rotatably 65 mounted on an axle body 1. Each brake disc 3 is overlapped by a floating saddle 4 onto the outer side of which a brake shoe is secured and the inner side of which a tubular pull rod 6 engages. Mounted in the pull rod 6 is a push rod 7 to which inside the 75 floating saddle 4 a brake shoe 8 is fixed.

At the inner end of each pull rod 6 a housing 9 is flanged on; in this housing a floatingly mounted actuation device is disposed for each disc brake.

The actuation device consists of two pairs of 80 cotters each having an outer cotter 10 and an inner cotter 11, and a membrane cylinder 12 the piston rod 13 of which is connected with the two inner cotters 11 by means of a spring clamp 14. Flat cage roller bearings 15 are arranged between the cotters of 85 each pair.

Between the two inner cotters 11, the upper ends of which are guided on a spring 16 connected with the piston rod 13, there is arranged an automatic adjustment device for the compensation of the brake 90 band lining wear; this adjustment device consists of a threaded bolt 17 with cotter elements 18 situated between the inner cotters 11 (*Figure 4*) and an adjustment lever 19 which is mounted with a sleeve overrunning clutch 20 on the threaded bolt 17 and 95 engages into a slide 21 fixed on the housing 9. The two cotter elements 18 are arranged with right and left threads on the threaded bolt 17. The contact surfaces between the inner cotters 11 and the cotter elements 18 are conical.

100 The actuation device and adjustment device operate as follows:

The membrane cylinder 12 transmits a brake pressure with its piston rod 13 onto the inner cotters 11 which, via the flat cage roller bearings 15, press 105 the outer cotters 10 apart. Thereby the pull rod 6 and the push rod 7 are moved relative to one another, i.e. the two brake shoes 5,8 are braced against the brake disc 3. When the membrane cylinder is again released, a plate spring 22 arranged between the pull 110 rod 6 and the push rod 7 and disposed between the pull rod 6 and a grip screw 23 mounted on the push rod 7, restores the normal air gap between the brake shoes 5,8 and the brake disc 3.

When the inner cotters 11, as the brake band lining 115 wears, effect too great a stroke, the threaded bolt 17 is rotated with the adjustment lever 19 on the return stroke, so that the two cotter elements 18 gradually slip inwards and assume the position represented in *Figure 4*. Thereby the two inner cotters 11 are moved

120 apart gradually from the starting position represented in *Figure 3* as far as the final position shown in *Figure 4* and thereby the brake band lining wear is compensated by an increase of the cotter width determined by the two inner cotters 11.

125 To set the actuation device and adjustment device to the prescribed air gap, particularly after a change of brake band lining, there is provided in one end of the threaded bolt 17 an inner hexagon 24 which is accessible from outside by means of a locking screw

130 25.

## CLAIMS

1. An actuating device for a disc brake whose  
5 brake shoes are disposed on opposite sides of a  
brake disc, the device comprising a pull rod and a  
co-extensive push rod for co-operation with respec-  
tive brake shoes, two pairs of cotters disposed  
between the pull rod and the push rod as outer  
10 cotters and inner cotters, and an automatic adjust-  
ment device for controlling the separation distance  
between the inner cotters, comprising: a threaded  
bolt having cotter elements threaded thereon each  
engaging the inner faces of the inner cotters; and  
15 turning means co-operating with the bolt, arranged  
to turn the bolt, and thus cause the cotter elements  
to increase the said separation distance, in response  
to an extreme relative movement of the inner and  
outer cotters.
- 20 2. An actuating device according to claim 1,  
wherein the turning means is a sleeve overrunning  
clutch on the bolt, having an adjustment lever  
co-operating with a slide stationary with respect to  
the outer cotters, to turn the bolt in response to  
25 extreme relative movement of the adjustment device  
and the outer cotters.
3. An actuating device according to claim 1 or 2,  
wherein the cotter elements are conical, and the bolt  
is oppositely threaded at either end to receive the  
30 internally-threaded cotter elements, so that turning  
the bolt causes their relative movement.
4. An actuating device according to claim 3, as  
appendent to claim 2, wherein the overrunning  
clutch is mounted on the middle region of the bolt,  
35 and its adjustment lever co-operates with a slide in  
one of the outer cotters.
5. A disc brake having brake shoes for disposal  
on opposite sides of a brake disc, and an actuating  
device according to any preceding claim, whose  
40 push rod and pull rod co-operates with the brake  
shoes.
6. An actuating device substantially as described  
herein with reference to the accompanying draw-  
ings.
- 45 7. A disc brake substantially as described herein  
with reference to the accompanying drawings.

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